

METHOD OF FABRICATING OPTICAL FIBER PREFORM AND METHOD OF
FABRICATING OPTICAL FIBER

Field of the Invention

The present invention relates to a method of fabricating an optical fiber preform and a method of fabricating an optical fiber for use in fabricating an optical fiber for conducting the single mode transmission with low transmission losses in the wavelength range of about 1.3 to 1.6 μm .

Background of the Invention

Recently, with a rapidly growing amount of communication information, the era of the wavelength division multiplexing (WDM) transmission is coming. The WDM transmission is a system for transmitting a plurality of light signals, in which the wavelength for the optical communication is divided into a plurality of wavelengths, not one wavelength. The WDM is an optical transmission system suitable for high capacity and high bit-rate communication.

The transmission networks of the optical communication are formed by using single mode optical fibers having a zero dispersion wavelength in a 1.31 μm waveband, laying all over the world, as the subscriber networks are centered.

However, orthodox single mode optical fibers have great transmission losses in a waveband of 1.36 to 1.43 μm due to

the light absorption by hydroxyl groups (OH groups). In addition, the light absorption peak wavelength of the hydroxyl group exists in 1.24 μm and 1.38 μm . On this account, the wavelength for the above-mentioned WDM transmission conducted by using the single mode optical fiber has been limited to the wavebands of 1.31 and 1.55 μm .

Then, an optical fiber that reduces the absorption peak in the waveband of 1.36 to 1.43 μm to solve the problem of the single mode optical fiber has been proposed. Furthermore, the WDM transmission system that uses the proposed optical fiber and utilizes the entire wavelengths of about 1.3 to 1.6 μm has been proposed.

For example, Japanese Patent Application (Application No. 171575/1999) describes a method of fabricating an optical fiber preform to obtain an optical fiber where the absorption peak in the waveband of 1.36 to 1.43 μm is reduced. The points of the method of fabricating the optical fiber preform are as follows.

- (1) First, a porous core rod is produced by vapor-phase axial deposition (VAD). Additionally, the porous core rod is produced by covering a core with a thin first cladding by VAD.
- (2) Then, after the porous core rod is dehydrated and sintered, it is heated and stretched.
- (3) Subsequently, OH groups on the surface of the porous core rod are removed by etching treatment.

(4) The porous core rod in which the OH group concentration has been thus reduced is inserted into a glass tube for a cladding cover with a reduced OH group concentration. The cover glass tube is crushed by heating to fabricate an optical fiber preform with a cladding having a sufficient thickness.

Summary of the Invention

The invention is to provide a method of fabricating an optical fiber preform and a method of fabricating an optical fiber using the same method.

The method of fabricating an optical fiber preform of the invention comprises:

a porous core rod producing step for depositing a first cladding having an outer diameter D so as to surround a core having an outer diameter d to produce a porous core rod of $D/d \geq 4.0$, using vapor-phase axial deposition;

a core rod dehydrating step for dehydrating the porous core rod to reduce an OH group concentration in the porous core rod to 0.8 ppb or less by weight ratio after the porous core rod producing step;

a core rod vitrifying step for forming the porous core rod to be transparent and vitrified to form a vitrified core rod after the core rod dehydrating step;

a core rod stretching step for heating and stretching the vitrified core rod after the core rod vitrifying step;